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AUTHOR Rieth, Herbert
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ABSTRACT

This paper identifies curriculum and instructional issues in secondary school programs for students with mild disabilities, describes some promising lines of ongoing research, and recommends long and short term research, development, and demonstration activities for support by the federal Office of Special Education Programs. The first section reviews the status of research on this population highlighting such problems as severe academic deficits, inadequate interpersonal skills, and a high dropout rate. Research comparing effects of intensive academic remediation with effects of emphasizing vocational skills and academic survival skills is recommended. The second section describes a comprehensive alternative curricular model with four components: (1) intensive instruction in reading and mathematics; (2) explicit instruction in survival skills; (3) successful completion of courses required for graduation; and (4) explicit planning for life after high school. Finally, research is reviewed and specific recommendations are made for further research in the areas of curriculum content (e.g., thinking skills, language arts, science); alternative forms of testing (curriculum based measurement, portfolio assessment, multiple strategies approach); the classroom environment, and goal and standard setting by both students and teachers. (65 references) (DB)

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CURRICULUM ISSUES IN SECONDARY SCHOOL PROGRAMS FOR STUDENTS WITH MILD DISABILITIES

Herbert Rieth
Vanderbilt University

September 1990

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I. RESEARCH IN SECONDARY EDUCATION

This paper has a three fold purpose. The first is to identify some of the curriculum and instruction related issues that are confronting secondary school programs for mildly disabled students. The second is to briefly describe some promising lines of ongoing research focusing on four curriculum and instruction issues (differential curriculum, alternative testing strategies, classroom environmental variables, curricular goals and standards) pertaining to the education of students with mild disabilities in secondary school programs. The third is to use the promising research findings as a basis to formulate long and short-term research, development, and model demonstration activities suitable for federal investments designed to enhance our knowledge of effective educational practices for persons with disabilities in secondary school settings.

The paper is also divided into three sections. The first reviews the status of research regarding disabled students in secondary education and highlights the problems endemic to this population and setting. The second describes a comprehensive alternative curricular model for educating students with disabilities in secondary school settings which addresses some of the problems articulated in section one. The final section includes research summaries and recommendations for future research, development, and model demonstration activities in four areas of curriculum and instruction. The first is content instruction in language arts, mathematics, social studies, and science. The others include alternative testing strategies, classroom environmental variables, and curricular standards and goals.

A. Curriculum Issues in Secondary Education

It has not been until recently that adolescents and young adults have received their fair share of special education services (Halpern and Benz, 1987; Schloss, Smith, and Schloss, 1990). Despite the recent

increase in services for disabled students in secondary school program they continue to experience extensive academic and social difficulties (Maheady, Sacca, and Harper, 1988). They include:

- Severe deficits in basic academic skills such as reading, spelling, and math;
- Generalized failure and below average performance in content area courses such as science, social studies, and health;
- Deficient work-related skills, such as listening well in class, note taking, study and test-taking skills;
- Passive academic involvement and a pervasive lack of motivation; and
- Inadequate interpersonal skills.

These difficulties contribute to disabled students general lack of academic progress during high school (Schumaker, Deshler, and Ellis, 1986).

Related findings indicate that adolescents with mild disabilities are also at greater risk than "normal" or slow achieving peers to receive a failing grade with almost one in three youths with disabilities receiving at least one failing grade in their most recent school year (Wagner, 1990). Zigmond, Levin, and Laurie (1985) found that 20 percent of a sample of learning disabled (LD) secondary school students failed more mainstream courses than they passed. Donahoe and Zigmond (1990) found that while approximately 75 percent of LD ninth graders passed mainstream Health courses, only 60 percent passed Science, and less than 50 percent earned passing grades in Social Studies.

The consequences of failing courses, particularly those needed for graduation, are serious (Wagner, 1989). Students who fail to accumulate sufficient numbers of required credits to pass ninth grade frequently drop out of high school before graduation (Thornton and Zigmond, 1986). Passing ninth grade, however, does not guarantee

successful completion of high school, but failing ninth grade is devastating to students with learning disabilities. By leaving school early, they also may miss educational experiences that could benefit them in their transition.

After further analyzing the failures of adolescents with disabilities Wagner (1990) concluded that their educational deficits were not first experienced at the secondary school level. In fact, Wagner reported that 73 percent of students classified as learning disabled were at least one year older than the typical age-for-grade, which is a commonly used proxy measure of earlier grade retention (Shepard and Smith, 1989). These data underscore the importance of developing interventions designed to help youths avoid failure in school and thereby increase the likelihood that they finish school and learn skills that enable them to attain better transition outcomes.

Other factors that have contributed to failing grades among adolescents with disabilities included frequent class cutting and tardiness (Zigmond, Kerr, Brown, and Harris, 1984). In addition teachers report that these students arrive without a writing implement, notepaper or textbook at least 30 percent of the time and characterize them as poorly organized, inept at taking notes, identifying main ideas in lectures and texts, following directions, and completing and turning in assignments (Zigmond, Kerr, and Schaeffer, 1988).

Wagner (1990) found that the more time disabled students spent in the educational mainstream the more likely they were to fail at least one course. The majority of secondary students with learning disabilities are held to the same grading standard as nondisabled students in regular education classes, and generally are not provided direct services, such as tutoring assistance, in order to meet academic expectations, beyond what is available through their special education courses (Wagner, 1990). In addition their regular education teachers are not routinely provided with substantial direct support for instructing students with disabilities.

These data indicate that disabled students can be instructed poorly either in regular or special education settings and suggests the

importance of providing effective instruction and support services for students with learning problems, regardless of their placement (Wagner, 1990).

The consequences of school failure is reflected in the high drop out rates reported for students with mild disabilities. For example, Hasazi, Gordon, and Roe (1985) reported that 34 percent of a sample of Vermont special education students left school prior to graduation. Lichtenstein reported a 40 percent dropout rate for disabled students in the state of New Hampshire. Even higher dropout rates of 42 percent (Cobb and Crump, 1984), 47 percent (Levin, Zigmond, and Birch, 1985), 50 percent (Edgar, 1987), and 53 percent (Zigmond and Thornton, 1985) were reported in some urban school districts. In general, disabled youths are significantly less likely than non-disabled youth to graduate from high school, get any postsecondary education, find employment or become engaged in any productive activity after high school (Wagner 1989). These outcomes assume greater importance because post school transition is strongly related to success in school.

Edgar (1987), however, reported that the outlook for disabled students who remained in school and graduated was almost as bleak. Less than 15 percent, of his sample of disabled high school graduates, obtained employment with a salary above minimum wage. In general, he found that employment rates and wages tend to lag behind non-disabled peers.

Edgar (1987) and Zigmond (In Press) both suggest that the endemic deficient academic skills, failing grades, high dropout rates and depressed employment prospects demonstrated by disabled adolescents warrants a major change in secondary special education programs. They suggest that secondary curricula in special education, especially in the mainstream, is nonfunctional as related to the stated goals of special education (Edgar, 1987). Additional research, development and model demonstration programs are required to identify alternative educational models and procedures to counteract these problems.

B. Research Recommendations

It has been noted students with mild disabilities fail more classes than their nondisabled peers, dropout more often and have learning and behavior characteristics that include: acquiring information and skills at a slower rate; unlikely to acquire information and skills through incidental learning, failure to generalize information and skills learned in one setting to other settings, and inability to retain information and skills following instruction (Schloss and Sedlak, 1986). The bleak picture and the dearth of instructional intervention studies suggest the need for an ambitious agenda of research, development and demonstration projects that focus on enhancing the acquisition, maintenance, and transfer of academic skills by disabled secondary school students. A primary goal is to obtain information that may help resolve the perennial question of whether to remediate academics extensively or simply concentrate on teaching minimal academic survival skills and focus more extensively on vocational skills. The dearth of intervention studies rationalizes assigning high priority to this research focus.

A two level research agenda is recommended. The first level consists of two components. The first component includes additional short duration (e.g. three years) descriptive and experimental studies designed to increase the fund of knowledge about this population, their behavior, the curriculum, their teachers' behavior, the instructional strategies employed, the general ecology, the opportunities to respond and home school cooperation.

Recent work in cognitive psychology, focusing on the higher order thinking and problem solving strategies, is recommended for short-term research agenda. These strategies appear to be potentially effective components of instructional interventions in multiple academic content areas. It should be noted, however, that while the work in this area is intellectually appealing the empirical base is very small. In addition advocates of this approach argue that a thinking skills oriented approach to curriculum and instruction will enable students to

transfer this knowledge to enhance their basic skills. However, the scant empirical support for this hypothesis argues for additional research including studies that focus on operationalizing this instructional approach, documenting its efficacy and describing the variables associated with effective applications.

The second component of level one consists of a series of intervention research studies designed to identify instructional, teaching, and curricular strategies that enable adolescents with mild disabilities to acquire, maintain, and transfer academic and social skills that will help reduce the number of course failures, increase skill repertories and improve graduation and employment outcomes. The outcomes of these studies should undergird the level two research studies.

The level two studies recommended include five year comprehensive projects that include multifaceted interventions that address academic, social, and vocational skills, employ the most effective and efficient instructional approaches in well organized and managed classes focused on rapidly accelerating the rate of acquisition, maintenance and transfer of essential academic, social and vocational skills. Also, the projects should include rigorous research designs and focus on measuring impact on a series of academic, social, and vocational outcomes.

II. AN ILLUSTRATIVE EXAMPLE OF AN ALTERNATIVE SECONDARY PROGRAM MODEL

This section of the paper provides a description of components of an illustration of a comprehensive alternative model program proposed by Zigmond (in press). Zigmond's model has considerable intuitive appeal but has not been empirically validated. It is presented here to illustrate an alternative approach to the curricular and program issues that must be addressed to improve secondary school program outcomes. The model focuses on four components, which appear to have face validity as program foci for students with mild disabilities. They include: intensive instruction in reading and mathematics; explicit instruction in survival skills; successful completion of courses required for graduation, and, explicit planning for life after high school. The model implicitly suggests a differentiated curriculum for disabled students that is justified by the endemic academic and social problems, failing grades, high dropout rates and poor employment outcomes experienced by students with mild disabilities.

Intensive Instruction

As disabled students are not proficient in basic academic skills intensive instruction is recommended. These skill deficits contribute substantially to the failing grades in mainstream courses such as English, Social Studies, and Science which rely heavily on reading and writing skills (Donahoe and Zigmond, 1990). Therefore high school programs for students with disabilities must provide intensive and efficient instruction in basic literacy skills to prepare disabled students for employment and independent living.

Despite the pervasive academic problems few intervention studies focusing on effective and efficient curriculum and instruction strategies have been reported. To address this problem an ambitious agenda of directed research and model programs designed to enhance the basic skill repertories of secondary school students with disabilities is proposed. The agenda should include some studies that analyze the impact of interventions designed to improve student academic skills

while others explore the impact of the enhanced skills on outcome measures related to school success and employment. Studies exploring strategies for teaching basic skills in isolation and in the context of vocational and/or problem solving or thinking skills are recommended. In addition studies evaluating the role of technology to enhance skill acquisition, maintenance and transfer are recommended for inclusion in the future research agenda.

Survival Skills

A second component involves providing explicit instruction in survival skills including behavior control, social skills, teacher pleasing behaviors, and study skills (Zigmond, in press). This content is deemed important because of the well documented social skill deficits among high school students with mild disabilities and their detrimental impact on academic, social and vocational outcomes (Walker, 1988).

Behavior Control. Zigmond (In Press) suggests that behavior control activities must be designed to help students who are often in trouble and who are frequently suspended or punished. The students require explicit instruction to understand the relationship between their behavior and the outcomes. They must be instructed in alternative ways of responding to particular situations, and to forecast the consequences of behaving one way or another.

Social Skills. Walker (1988) argues persuasively for providing students with disabilities direct social skills instruction. The primary arguments that he uses include: (a) adolescents may need training in social skills to derive maximum benefit from academic instruction or they may need training in lieu of academic instruction for a period of time; (b) social skills training may facilitate mainstreaming efforts, contribute to peer and teacher acceptance, and substantially improve the prospect for post school employment success, and (c) because effective performance across multiple domains and settings closely related to adequate interpersonal functioning and overall social competence.

Systematic social skills instruction during adolescence may have important implications for the adolescent's school success, capacity for independent living, ability to access and maintain employment and recruitment of adequate social support networks. Walker (1988) recommends that it is important that social skills training be regarded as an instructional as opposed to behavior intervention. He reports that social skills training is a cognitively based process in which students are instructed in procedures for developing socially competent responses to frequently encountered social situations. Behavior management procedures are recommended to facilitate the display, maintenance and generalization of cognitively mastered social skills in target environments.

Walker (1988) recommends future research on social skills address gaps in the current knowledge base. Priority items include; analyses of the efficacy of a social ecological approach to remediating social skills deficits, additional empirical studies seeking to identify important social skills, analysis of the efficacy of technology in teaching social skills and longitudinal studies of social skills.

Teacher Pleasing Behavior. A teacher pleasing behavior curriculum may help disabled students acquire behavior that most students learn, incidentally. These include skills such as making eye contact, looking interested in a lesson, volunteering an answer and looking busy, that lead teachers to consider them more positively (Zigmond, in press). Students with disabilities often need to be taught, explicitly, how to act like a good students (Schumaker, Deshler, and Ellis, 1986; Schloss and Sedlak 1986; Zigmond, in press). For example, Graubard, Rosenberg, and Miller (1974) demonstrated that elementary school students can be taught these skills and that they produce a positive impact on teacher perceptions and behavior toward these students.

Self monitoring is considered to be a major component of the teacher pleasing curriculum content. Zigmond, in Press, suggests teaching students to self record their performance of target behavior daily on self-monitoring forms that are checked by their teachers at regular intervals. The number of skills that students self monitor

increases gradually until students are recording their performance on as many as seven or eight skills. Non-directed research is suggested to identify additional student behaviors correlated with positive teacher perceptions and to develop interventions to teach individual social skills and teacher pleasing skills. Procedures for training students to acquire, maintain, and transfer self monitoring and self control skills are recommended. Research and development projects that address the absence of a comprehensive survival skills curriculum are also recommended.

Study Skills. Schumaker et al., (1986) and Zigmond (in press) suggest that study skills instruction should focus on metacognitive skills, class attendance, assignment completion, attentiveness, and compliance behavior. Metacognitive instruction focuses on teaching students how to learn. Students learn general methods or strategies for remembering and summarizing content area material, how to proofread a paper, and how to take notes from lectures (Schumaker et al., 1986). Woodward and Noell (in press) however, believes that the efficacy of these methods with secondary students with mild disabilities remains an open question for two reasons. First the readability and concept and vocabulary density of many secondary school textbooks particularly for students with disabilities is very high. Important topics are discussed insufficiently, references are ambiguous, too many concepts are presented in too short of space, and a considerable amount of background knowledge is simply assumed.

Second even if these general methods help students answer questions and take tests, the extent to which students learn anything in depth, much less engage in the kind of higher order thinking is improbable (Woodward and Noell, in press). Studies have demonstrated that students can, in some situations, learn to apply the study skills successfully but data supporting generalization of skills across content and skill areas are needed. Therefore, additional research is needed to explore the impact of study skills instruction across a broader array of academic content areas. In addition research

analyzing students ability to transfer study skill strategies across assignments, classes, and specific content domains are warranted.

Vocational Skills

More and more educators recognize the need to prepare adolescents for successful transition to life after high school and are suggesting the need for formal vocational instruction (Zigmond, in press). The instruction targets two distinct groups of students with mild disabilities. The first, which constitutes a relatively small segment of the population, includes students who are planning to attend college and need help in selecting appropriate higher education institutions, in arranging for adapted versions of college entrance examinations, and in completing applications for admission.

The second is non college-bound students who need help in planning post school occupations that might be satisfying, and training that might be needed during and after high school. Many students are counseled into vocational education track as part of transition planning, but this solution does not guarantee successful transition. Phelps (1985) stated that in "most states, the access to and the quality of vocational programs has already been significantly reduced and eroded ... without compromise, rigorous, and occupationally-specific vocational education programs at the secondary level, it is highly unlikely that either the education or employment needs of disadvantaged or handicapped youth will be adequately met during the decade ahead." Thornton (1987) and Zigmond and Thornton (1985) reinforced Phelps' statement as they found no evidence that mainstream vocational education programs actually provided disabled students with better preparation for employment than the more traditional academic curriculum.

The failure of vocational education programs to better prepare students for post school employment suggests the need to develop and analyze alternative approaches to vocational education. Directed research is required to explore alternative approaches to; the curriculum, instructional strategies employed, teacher behavior,

opportunities to respond, classroom organization and management strategies, career counseling procedures student behavior and the status of students with disabilities in vocational education programs. In addition studies examining the relationship between program content and employment related outcomes are essential. Studies exploring alternative differential curricula, instructional and field placement strategies in vocational education settings also are recommended. Related research focusing on transition issues appears to be quite important.

Other investigators have provided independent support for the curricular content proposed in Zigmond's model. For example, Halpern and Benz (1987) recommended four domains that accommodate the needs of all secondary students whether or not they have disabilities are: (a) basic knowledge and skills such as reading, computation and study skills; (b) academic knowledge and skills, such as literature, chemistry, and history; (c) occupational knowledge and skills such as job finding skills and work experience, and (d) independent living knowledge and skills such as budgeting home management, and social skills.

Lovett, Richards, and Gaylord-Ross (in press) recommend a curricular orientation that has three general foci: (a) remedial; (b) maintenance, and (c) functional. The remedial focus emphasizes basic skills that feature the development and/or remediation of academic skills and social skills germane to the social competence important for school and job success. The maintenance focus includes a tutorial component designed to help students in their regular education classes and a learning strategies component which teaches students cognitive-based strategies for learning broad concepts. The functional focus targets vocational and life skills. It directly incorporates vocational preparation content into the students academic program. The orientation involving life skills/adult outcomes stresses community valid comprehensive life skills.

Research is needed to validate the curriculum, curriculum content, curricular sequence and the delivery mechanisms including instruction,

teacher behavior, student learning, and support services described in this section. Additional studies are recommended to explore the relationship of outcome variables to program content, field experience and student behavior.

III. RESEARCH SUMMARIES

A. Curriculum Content Research

Thinking Skills

One of the primary and perhaps more promising research foci in American education is in the area of thinking skills. Carnine (in press) advocates for major curricular modifications to enhance the acquisition of higher order thinking processes by all students. Sternberg (1990) argues that styles of thinking and learning are every bit as important as levels of ability and believes that students thinking styles are being ignored as teachers structure learning tasks. Carnine (in press) argues that many interventions including efficient teaching techniques, cooperative learning, and metacognition are wasted to some degree when curricular materials organize content in a fragmented manner that is most amendable to rote learning. While the acquisition of basic requisite knowledge is important, it is equally important for students with disabilities to develop higher order thinking skills. They require instructional material that is organized to model higher order thinking and is taught efficiently, so they have an opportunity to master, apply and remember important schemes. In addition students with mild disabilities could benefit from learning relationships among concepts and knowledge known as "samenesses" (Carnine, in press).

Resnick and Klopfer (1989) also argue that educators must develop student's thinking abilities. They suggest the need for developing a new instructional theory which is concerned with: how to present and sequence information, how to organize practice and feedback, how to motivate students, and how to assess learning. Although cognitive research has not focused directly on students with mild learning problems the conclusions from this research may enhance the special education literature base. Resnick and Klopfer (1989) argue that a fundamental principle of cognition is that learning requires knowledge

and that knowledge cannot be imparted directly to students. Rather, students must play an active role in acquiring knowledge by actively questioning the instructor and elaborating the new information in relation to their existing knowledge. Through this process generative knowledge is developed which students can use to interpret new situations, solve problems, think and reason, and learn.

To develop meaningful knowledge accessible by learners, Bransford, Sherwood, Hasselbring, Kinzer, and Williams (in press) suggested using real-world problem situations as instructional "anchors." This approach emphasizes the importance of creating a contextual anchor to generate interest and enable the students to identify and define problems and to pay attention to their own perceptions and comprehension of these problems. These instructional anchors help students identify the relevant features of problems situations in order to select appropriate information for generating strategies for solving a variety of problems (Cognition and Technology Group, 1990).

Prawat (1989) urges researchers to examine strategies that look beyond instructional approaches, to the organization of the content itself. Specific foci included: (a) developing correspondences between various ways of representing concepts and procedures, (b) making explicit how important elements of the knowledge base relate to each other, and (c) acknowledging and being sensitive to students' naive knowledge or misconceptions. Similar arguments can be made for specific research examining the issue of sameness in specific content areas.

Thinking skills are a high priority for inclusion in the special education research agenda. In general research and demonstration projects are needed that operationalize and analyze the efficacy of instructional applications of thinking skills in multiple content areas are needed. While teaching higher order thinking skills might enhance basic academic skills, no empirical information presently supports this assertion. Therefore directed short term research projects that develop strategies and curricula for teaching thinking skills and analyze the impact on academic outcomes are recommended as a high

priority. Long term intervention studies that track the impact of thinking skills on academic outcomes, skill acquisition, grades, school completion and transfer to employment outcomes are also recommended.

Other challenges, that face educators once this approach is operationalized and tested, include translating the research into practice and identifying strategies to facilitate the adoption of the innovative instructional practices. In this case additional research is recommended to develop; (a) strategies translating research to practice, and (b) strategies to assist teachers to accurately implement the innovative procedures into their classroom programs.

Language Arts

Taylor (1989) suggests that research and principles of efficient instruction support combining reading, writing and language development instruction. The research foundation, however, is emergent, however and requires additional supportive data before being widely adopted. Taylor (1989) argues that there is an infinite variety of literacy acquisition patterns and recommends more research to help us broaden our understanding of complex literacy behaviors. The potential efficiency of combining reading, writing and language development justifies supporting additional research studies analyzing this approach. These studies might provide the framework for longer term studies that might focus on broader interventions that are evaluated in a variety of secondary school environments.

After analyzing different approaches for teaching basic reading, Turner (1989) concluded that randomized field study results suggest that phonics instruction falls into that vast category of weak instructional treatments with which education is perennially plagued. Perhaps it is time for reading experts to turn away from the debate over systematic phonics in search of more powerful instructional treatments for beginning reading that will influence the development of literacy in the middle grades and beyond.

Research is recommended that analyzes the impact of teaching students to independently use strategies involving summarization,

mental imagery, self-questioning, and question answering. Few if any studies have examined the efficacy of comprehension training at the secondary level. The impact of technology enhanced education, contextual anchors, combined language arts instruction, sameness instruction and thinking skills on vocabulary acquisition, fluency and comprehension is recommended as a focus for short term investigations.

Spelling

A major aspect of writing involves correctly sequencing letters in a word to produce predictable phoneme-grapheme patterns. While many educators do not consider spelling an important skill poor skills impede the interpretation of written text. Although sporadic attention has been given to effective methods of spelling instruction some recent evidence suggest that spelling ability may be vastly facilitated through the integration of spelling and other meaning based language arts instruction (Dixon, in press). Such integration may enhance overall language arts understanding as well.

Weekly spelling word lists constitute the focus of spelling instruction. Usually these are organized around phonetic patterns which have been found to lead students either to memorize their lists by rote, or to induce generalizations (Dixon, in press). The difference between memorizing and generalizing in spelling is a key consideration in the quest for more efficient instruction as the difference leads students to learn more words in less time. Dixon (in press) has urged educators to adopt a morphophonemic approach to spelling one that can be expected to generalize to a very large percentage of words and should be enough to redirect investigations toward paths less burdensome for students.

Research investigating the impact of this approach is recommended as part of a research agenda. In addition research investigating the instructional design and sequencing variables that enhance students ability to acquire, maintain, and generalize spelling skills might also prove fruitful.

Math

School mathematics learning goals appear to have shifted over the last five years from basic skills and direct instruction to higher-order thinking and problem solving (Porter. in press). While this approach might be productive for non-disabled students studies have not established the value of this approach with disabled students. But this method has intuitive logic suggesting that unless students are taught to use their conceptual skills in mathematics for solving novel problems, the value of their mathematical knowledge and skills will be severely limited. Although this observation seems obvious, studies have indicated that many teachers also use the same mathematics textbook vary substantially in the amount of time they allocate to mathematics instruction and to a considerable extent the mathematics content they cover (e.g., Porter, in press; Freeman and Porter, in press; Barr, 1988). These variables are important since they affect outcomes. The relatively small number of studies analyzing these behaviors highlight the importance of additional research in this area.

Lloyd and Keller (1989) highlighted two key points from research on cognitive processes. First as children become more proficient in addition, they develop strategies that are based on previous strategies, are more efficient than earlier ones, and are likely to be similar to patterns of development in other individuals. Second conceptual and procedural knowledge are linked and change together. Lloyd and Keller suggest that while emphasis is often placed on teaching pupils how to perform arithmetic operations, research is needed to determine if instructional approaches should teach concepts while attempting to change procedural strategies. In general more complete instruction that teaches all of the steps that pupils will need to function independently is more effective than less complete instruction. Research is needed to identify the most efficient strategies that can be taught without previous exposure to the preceding sequence of less efficient strategies. Information is needed to determine whether students with disabilities can learn intermediary steps as readily as their peers. Research is needed to identify

strategies for efficiently teaching knowledge and enabling students to link new with existing knowledge and apply it to solving problems. Short duration research studies are needed to identify essential facts and knowledge and focus on identifying approaches that facilitate knowledge acquisition, maintenance, and transfer.

Social Studies

The National Assessment of Education Progress of student knowledge of democratic principles and history reported that a sample of 17 year old students enrolled in general education were able to answer only 54.5 percent of the test items correctly (Kinder and Bursuck, in press). In one of the few analyses of the social studies performance of students with disabilities Patton, Polloway, and Cronin (1987) found that 36 percent of secondary special education teachers did not even teach social studies. Foley (1989) analyzed the number of students in resource room settings that received history instruction in general education settings and reported that only 55 of 120 middle and junior high school students were placed in mainstreamed social studies or history classes. Thus it appears that many student with mild disabilities don't even receive instruction in history or social studies.

One promising instructional strategy developed by Kinder (1989) is a complete program which includes preskills instruction, problem-solution-effect note-taking, time lines, vocabulary, and a reciprocal questioning components. Preliminary data reported by Kinder and Bursuck (in press) suggest that this approach is successful in teaching american history content to students with mild disabilities. Whether students can independently apply this strategy in other settings, however is unclear and should be examined further.

Generally, Brophy (1990) suggests that social studies education scholarship has produced many useful ideas concerning rationales for social education, general purposes and goals for social studies, and general approaches to accomplishing them, but it has not yet produced an extensive empirical knowledge base. He found very little research

available linking particular curriculum, instruction, or evaluation practices to measured student outcomes, and little systematic testing of theoretically optimal program against plausible alternatives. These issues as well as research on the role of thinking skills in teaching social studies constitute important components of a research agenda for instruction with students with disabilities.

Science

Recent cognitive research makes a compelling case for teaching higher order thinking in the context of traditional subject areas such as science, social studies, and mathematics (Woodward and Noell, in press). The goal is to teach problem solving in conjunction with the essential facts and concepts.

Woodward and Noell (in press) suggests a thorough revamping of the curriculum to focus on the principles of sameness coupled with relevant, coherent explanations that help students understand, think systematically and apply what they know to a range of transfer problems. The model involves judicious selection of conceptual knowledge which would be taught more explicitly. In Woodward model concepts are well-sequenced, and students are tested for mastery of the material each step of the way. Another recommendation is that videodisc technology be used as a primary instructional medium. Woodward argues that these curricula are more commensurate with instruction at the secondary level and allow students who are typically deprived of these subjects opportunities to learn the content. He argues that students will doubly benefit from this kind of instruction: they are presented with a challenging content area, and required to apply higher order thinking skills to domain specific problems. Woodward's proposals are interesting and constitute the focus of recommended research activities. Contrasting studies which focus on problem solving approaches also are recommended.

In summary, researchers in each of the previously discussed content areas argue for extensive curricular modification if we are to enhance student learning. The unanimity of the recommendations argues

for the continuation of the curricular content analyses research projects currently funded by the Office of Special Education Programs until all of the major academic content areas are studied.

B. Alternative Forms of Testing

Shavelson, Carey, and Webb (1990) suggest that Americans have developed a remarkable technology and a powerful achievement testing industry which is dominated by multiple-choice tests. However, the response format, prevents educators from learning important information such as how students formulate problems, develop answers and make final judgments regarding the best solution approaches. Shavelson et al. argue that achievement tests should capture students' conceptual understanding and problem-solving skills as well as their ability to apply their knowledge and understanding to novel situations. They propose testing students' understanding of science and mathematics with a variety of tasks and activities some dealing with symbolic representations and manipulations, some dealing with prediction and explanation of findings and others using experiments to test hypotheses.

Snow (1989) suggests that the design of instructionally useful assessments of instruction must address a series of difficult decisions. First, the different educational purposes served by assessments require different types of assessment instruments. Second, distinctive often multiple instructional goals demand a varied and flexible assessment strategy. Third, assessment in the service of learning and instruction must be diagnostic in the sense that it indicates alternative next steps for teaching a given learner. Fourth, the uniqueness of individuals and the variety of individual differences must be addressed. Finally he strongly recommend that research and development be designed to understand and to shape the interface between teachers and assessment procedures.

Recently, three promising alternatives have emerged that provide teachers with performance information suitable to guide program development and implementation decisions. One is curriculum-based measurement, the second is portfolio assessment and the third is multiple strategies approach to assessing thinking skills.

Curriculum-Based Measurement

Curriculum-based measurement (CBM) has been used more extensively with disabled students and has a stronger empirical base than the two other approaches. It is a standardized measurement system used to monitor basic skills growth and to improve instructional programs (Deno and Fuchs, 1987; Shinn, 1989). With CBM, teachers (a) determine the annual curricular goal for a student, (b) use a prescriptive measurement system first to sample the curriculum systematically to produce tests and then to regularly administer the short tests representing the annual curriculum, and (c) use the assessment information to monitor student progress and to adjust programs as necessary to increase the probability of goal attainment (Fuchs, Fuchs, Hamlett, and Ferguson, submitted for review). The primary datum within CBM is an index of student proficiency on the skills targeted for instruction across the school year (Fuchs, Fuchs, Hamlett and Stecker, 1990).

Operationally the teacher specifies the types of problems constituting the curriculum for the school year and creates multiple alternate tests comprised of these problems in proportions corresponding to the emphasis each is given in the curriculum. The tests are administered and scored in accordance with standard methods and the results are summarized graphically to assist the teacher (a) to monitor the appropriateness of student goals and revise them as necessary, (b) to judge the adequacy of student progress for determining when instructional improvements are warranted to increase the probability of goal attainment, and (c) to assess the relative efficacy of different interventions in order to determine how to build more successful programs (Fuchs, Fuchs, Hamlett and Stecker, 1990).

The research base is promising and curriculum-based assessment is frequently being cited as a method for enhancing the quality of educational services for disabled and non-disabled students (Christenson, Ysseldyke, and Thurlow, 1989); Gersten, Carnine, and Woodward, 1987; Zigmond and Miller, 1986). It is important to point out, however, that the supporting research has been done almost

exclusively with elementary and middle school students so the utility and efficacy with high school students is unknown. Given the promising data base it is extremely important to conduct additional research investigating its replicability in secondary schools.

Fuchs et al. (1990a) suggests a research agenda that analyzes the use of CBM data for: (a) instructional decision-making, (b) using data to monitor the appropriateness of goals and to adjust goals whenever possible, and (c) investigating the conditions under which CBM enhances instructional quality. Additional non-research is necessary to investigate the technical adequacy of this procedure, its efficacy, strategies for using the information for instructional decision making in secondary settings, and for enabling teachers to effectively implement this assessment procedure.

Portfolio Assessment

Portfolio assessment has been adapted from the disciplines of art and architecture. Traditionally, portfolios are used by professionals such as architects, artists, and models to accumulate work samples to show a potential employer.

In education, portfolio assessment has been used most extensively in the areas of writing and reading instruction. Wolf (1989) proposed using portfolio assessment to assess the thinking process in rigorous but undistorted ways. It has two aims. The first is to design ways of evaluating student learning that while providing information to teachers and school systems will also model personal responsibility in questioning and reflecting on one's own work. The second is to find ways of capturing growth over time so that students can become informed and thoughtful assessors of their own histories as learners.

Portfolios have been suggested as the focus of periodic student teacher conferences. Jongsma (1989) suggests that in preparing for student/teacher portfolio conferences, some teachers have students prepare a table of contents for the portfolio and then arrange their work by topics, by things they like best and least or by type of materials such as poems, stories, and books. She recommends holding a

minimum of four discussions per year with each student. The portfolio is seen as a growing, evolving description of students' reading and writing experiences and the discussion time allows teachers and students to share reactions and to pursue ideas about what the students are reading and writing.

The research base regarding this form of assessment is virtually non existent. The intellectual appeal and potential contribution of preparing dossiers for disabled secondary students argues persuasively for research. In particular, research is recommended that analyzes: (a) the technical adequacy, (b) the impact of this approach on student and teacher behavior, and (c) the feasibility using this procedure for program content modifications. It would also appear important to investigate the efficacy of video portfolios to document academic, social and vocational skills. The portfolio might be used by disabled students to demonstrate professional skill competencies to employers much like artists, models, and architects.

Multiple Strategies Approach

After analyzing the assessment literature on higher order cognitive skills, assessment literature Siegler (1989) argues that the often used chronometric techniques fail to identify the diverse array of strategies that students employed to solve problems. He suggests the need for more accurate models of assessment. He argues that traditional psychological models may be drastically incorrect, and that diagnoses of individuals based on these models can only be equally incorrect. He advocates a multiple strategy assessment approach that combines immediate retrospective verbal reports and video tapes of ongoing overt behavior as ways of obtaining more realistic depictions of strategy use. The multiple strategy approach provides educators with information regarding (a) the variety of strategies that children are using to cope with particular tasks, (b) the circumstances under which students use each approach, and (c) the advantages of varied strategies to the student. Siegler concludes that accurate assessment of children's strategies also promises to prove valuable for

understanding individual differences and suggesting differentiated instruction in many other academically relevant areas where children use diverse strategies.

Although he presents one study to substantiate his arguments, additional research demonstrating the technical adequacy of this approach and its limits to important outcomes is highly recommended. Nickerson (1989) poses a series of questions that frame future research and development activities. They include: (a) Can tests be developed that assess high-order cognitive ability that are easily administered and scored?; (b) can tests be developed that provide a clear indication of the depth of understanding of the concepts, principles relationships, and processes that constitute the substance of a course of study?; (c) what can be done to determine the extent to which an individual is able to apply the knowledge acquired in academic contexts to situations outside the classroom?; (d) can attitudes and dispositions that are believed to be among the important determinants of the quality of thinking be adequately assessed?; (e) how might the various purposes of testing be better served by the development of technology-based testing procedures?; (f) how can evaluation be made a more integral part of the teaching/learning process?, and (g) how to measure the transfer of higher-level cognitive functioning on academic tasks to situations outside the classroom.

C. Classroom Environment

Brophy and Good (1986), Rieth and Evertson (1988) and Christenson, Ysseldyke and Thurlow (1989) have provided comprehensive reviews of classroom environmental variables that were found to be correlated with student achievement outcomes. Rieth and Evertson (1988) reported that a number of pre- and post-instructional variables provide the essential staging area from which effective instruction is launched. They include the arrangement of classroom space and student seating, development of rules and procedures for behavior and academic work academic content, communicating learning goals, pacing and the careful allocation of instructional time.

Christenson et al., (1989) reported that a well-organized and efficiently run classroom is enhanced when students' knowledge about specific behavioral expectations and classroom routines is paired with the teacher's ability to monitor and follow through. These procedures set the stage for critical teaching variables such as effective demonstration and modeling procedures and lesson pacing which increase student attention, and academic engaged time. Rieth and Evertson (1988) reported that teachers who are effective create attractive, efficient learning environments and make a number of organizational decisions, prior to the opening of school, about (a) room arrangement, students desks, and seating, (b) needed rules and procedures, and (c) routines for accomplishing academic tasks and activities. Christenson et al., (1989) indicated that the creation of a positive climate in the classroom and the school is an important correlate of student learning. Student achievement is also related to the teachers ability to match students skill repertoires and task difficulty. Effective teachers provide clear learning goals and effectively communicate the rationales for academic tasks (Anderson, Evertson and Brophy, 1979). Evertson (1982) reported that sequencing the delivery of lesson content into several presentation-demonstration-practice-feedback cycles rather than developing plans requiring students to attend to a presentation or to work for 25 to 30 minutes on the same seatwork activity was more

effective with lower ability level classes. Barr (1988) reported that pacing instruction and student work can account for as much as 80 percent of the difference in achievement among high and low performers.

Rieth and Evertson (1988) observed that time and learning research has consistently demonstrated significant relationships between time spent on learning and student achievement. Rieth and Frick (1983) reported that the amount of instructional time is influenced by effective classroom management skills that not only increase the amount of time available to spend on instruction but also ensure that the time is continuous and relatively free of distractions, interruptions, and disruptions. Other research has demonstrated that students who engage in active academic responses make greater gains in achievement than students who's responses are passive (Greenwood, Delquadri, and Hall, 1984).

Christenson et al., (1989) indicate that teachers have a direct influence on students' opportunity to respond by interacting more with students, using error correction procedures, and calling on all students during instruction. Alternative teaching strategies such as choral responding, peer tutoring, and cooperative learning structures are suggested as ways to increase the number of opportunities a student has to respond. Available information therefore conducts that the educational environment should be structured to incorporate frequent evaluation that must be congruent with what is taught.

However, most of the supporting studies were conducted in elementary, middle, and junior high schools. The direct transfer to secondary environments is without extensive research support and constitutes an important component of a recommended research and development agenda. In addition since most of the data are correlational experimental intervention research studies are recommended.

In one of the few research studies investigating the secondary classroom environment Rieth, Bahr, Okolo, Polsgrove and Eckert (1987) analyzed teacher and student behavior in high school resource room programs. In general, the teachers used instructional approaches

commonly associated with regular high school classrooms. They included substantial dependence on paper-and pencil materials, considerable confusion in the directions and content of instructional tasks, and low rates of academic feedback all of which added up to a less than ideal instructional environments for the students in this sample. These data suggest the need for extensive research and development projects that extensively analyze the regular and special education instructional environments.

Initially, studies are needed to describe the instructional and organizational arrangements employed and then develop experimental interventions to enhance the instructional, organizational and management procedures employed in secondary classroom environments. Successful approaches can serve as the foundation for larger scale multi year demonstration projects designed to employ: (a) the best instructional practices, (b) the most effective curricular materials, and (c) well organized instructional environments, to learn their impact on academic, social, and vocational outcomes. Correlated longitudinal and follow up studies that explore relationships between school models and adult adjustment and employment are recommended.

Another strand of recommended research focuses on teacher thinking and planning skills. Teachers play a key role in instructing students as they ultimately decide what a student will study and how it will be taught. Yet little information exists to document how teachers make curricular decisions and how such constraints as limitations of the teacher's subject matter knowledge, pedagogical skills and repertoire for assessment practices influences their decisions (Porter, in press). Therefore additional research is recommended which explore teacher thinking and decision-making skills and their relation to curricular planning, instructional decision-making and the delivery of instruction.

D. Goal and Standard Setting

Despite the pivotal role of goals in education, there are very few systematic investigations reported that have examined the process, procedures and criteria used to set student and program goals at the classroom, school, school district, and state level in special education. We know very little about the procedures and decision-making processes that teachers employ to establish daily, weekly, monthly, or yearly academic goals for students. In fact, Fuchs (1986) found that despite the apparent importance of goals the goal-specification literature provides little useful information about guidelines for setting academic and social behavior performance goals for individual students.

The absence of guidelines has serious implications for practice. For example, individual educational programs (IEP) are employed ubiquitously in special education to provide broad outlines and direction for student programs but procedures for identifying appropriately ambitious goals are not provided. Fuchs, Fuchs, and Hamlett (1989) reported that IEP's are frequently set before the efficacy of the students' academic program has been established making it difficult to develop attainable but ambitious goals for students. In fact, the goal standards selected usually underestimate student performance and special education teachers must be specifically prompted to raise goals to more realistic levels. Thus, existing professional practices, that lead to the establishment of underestimated performance goals for disabled students, may be contributing, inadvertently, to the students lack of academic progress.

The goal setting literature reports very little about the procedures and decision-making processes employed to identify performance goals for advancing students from one grade level to another, determine when to modify the service delivery system, and determine the knowledge requirements for graduation. In the following section information will be presented that highlights promising work being conducted regarding the role of students in setting performance

goals and the role of teachers in establishing goals, and procedures for establishing competency testing programs.

Student Established Goals

Fuchs, Bahr, and Rieth (1989) indicated, that while there is research that supports the importance of goals in mediating human performance, little information is available regarding the procedures used to set educational goals. They suggest that individuals may be more likely to accept, commit to, and believe in their ability to achieve goals when they select rather than are assigned goals. They conducted a study investigating the impact of student participation in the selection of goals. They found that high school students, who set their own performance goals, improved their math computation performance more than students with assigned goals. The findings suggest that student participation in the goal selection process (a) improves performance outcomes, (b) enhances goal commitment, and (c) may enhance the sense of potential accomplishment.

The results suggest the need for additional research examining other dimensions of involving disabled students in the goal selection process and the resultant outcomes. For example Fuchs et al. (1989) suggest conducting additional research which investigates the role of goal participation on; achievement and the mediational role of locus of control, level of self-efficacy or demographic variables and years spent in special education and level of service delivery on goal setting, goal attainment and academic outcomes.

Teachers Established Goals

Fuchs, Fuchs, and Hamlett (1989) reported that special education teachers typically set goal standards that underestimate many students' potential and that they must be prompted to raise goals. They analyzed a process which employs CBM to dynamically develop goals so that progress toward mastery is monitored closely and goals are adjusted upward whenever possible. They found that specific goal setting

procedure employing reasonably ambitious goals generally enhances student achievement.

The relative ease and efficacy of employing CBM underscores the importance of additional research that systematically explores empirically-based approaches to setting, monitoring, and modifying student and program goals. A series of studies are needed to begin to build a data base in this important area of inquiry.

IV. SUMMARY AND CONCLUSIONS

Overall, the literature indicates that secondary school students with mild disabilities earn lower grades, fail more classes, and dropout more often than their "normal" peers. They have been found to have the following learning and behavior characteristics: information and skills are less likely to be acquired through experiences incidental to the central learning task; information and skills acquired in one setting are less likely to generalize to other settings or conditions; and information and skills are less likely to be retained following instruction (Schoss and Sedlak, 1986). This bleak picture is exacerbated by the dearth of intervention-based research studies focused on this population and setting.

The magnitude of the problem requires developing a research and development agenda that specifically addresses the endemic academic, social, and vocational problems encountered by disabled students in secondary school settings. This high priority agenda should focus on enhancing the acquisition, maintenance, and transfer of academic, social and vocational skills by disabled secondary school students. The two most highly recommended funding investments include model secondary demonstration programs and a series of intervention studies designed to improve academic, social, or vocational outcomes for mildly disabled secondary school students.

The model program priority should target funding five-year projects that provide comprehensive models that include multifaceted interventions designed to rapidly accelerate academic, social and vocational skills, contain effective systems to monitor academic skills, employ the most effective and efficient instructional approaches in well organized and managed classes. An comprehensive evaluation system that monitors impact on a series of academic, social and vocational outcomes is required. The second major focus is to fund intervention studies that focus on enhancing students academic, social, and vocational skills.

Finally research studies are recommended that: (a) provide additional descriptive information regarding student behavior, teacher behavior, and program ecological variables; (b) enhance the development of subject matter content skills, thinking skills; (c) expand our information base regarding effective assessment practices; and (d) provide information regarding goal setting activities.

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